Volume 4 •

Geomicrobiology Journal

An International Journal of Geomicrobiology and Microbial Biogeochemistry

Henry L. Ehrlich, *Editor*

Crane Russak • *New York*

The appearance of the code at the bottom of the first page of each article in this Journa indicates the copyright owner's consent that a single copy of the article may be made fo personal use. This consent is given on the condition that for multiple copies the copier pay fee of $2.00 per copy through the Copyright Clearance Center, Inc., 21 Congress Stree Salem, MA 01970. This consent does not extend to other kinds of copying, such as copying fo general distribution, for advertising or promotional purposes, for creating new collectiv works, or for resale.

Geomicrobiology Journ

ISSN: 0149–0

Published by Crane, Russak & Company, I
3 East 44th Street, New York, New York 10

Volume 4, 1985–1986 (4 issu
Subscription price for Volume 4: $72.00 plus postage and handli
Single copy price: $19.00 plus postage and handli
Personal subscriptions, payable by personal check
mailed to home address: $38.00 plus $6.00 post
and handling. Personal subscriptions are v
only in North Amer

Copyright © 1986 Crane, Russak & Company, I

No part of this publication may be stored in an electr
retrieval system or transmitted electronically without
prior written permission of the publis

Subscription orders and notification about change of addr
should be sent to the office of the publis

Claims for missing numbers will be honored only four months from date of iss

A microform edition of this journal is available t
subscribers from University Microfilms International, Ann Arbor, Michigan 48

Abstracted and/or indexe
Bioscience Information Ser
Chemical Abstracts Ser
Current Advances in Ecological Scie
Current Contents/Agriculture, Biology & Environmental Scie
Current Contents/Life Scie
ISI/Geo Sci T
Microbiology Abstr
Science Citation In

Printed in the United States of Ame

Contents

Extraction and Culture of Microorganisms from Rock
Günter Weirich and Reinhart Schweisfurth 1

Microbial Biomass and Productivity in Seagrass Beds
D. J. W. Moriarty, P. I. Boon, J. A. Hansen, W. G. Hunt, I. R. Poiner, P. C. Pollard, G. W. Skyring, and D. C. White 21

Microaerobic Conditions Are Required for Magnetite Formation Within *Aquaspirillum magnetotacticum*
R. P. Blakemore, K. A. Short, D. A. Bazylinski, C. Rosenblatt, and R. B. Frankel 53

Microbial Leaching of Arsenic from Low-Sulfide Gold Mine Material
Huan V. Luong, Joan Forshaug Braddock, and Edward J. Brown 73

Book Review 87

Papers of Interest in Other Journals 91

Meeting Announcements 97

Foreword
Henry L. Ehrlich 99

Dedication
Richard Y. Morita 101

Microbial Oil Transformation Processes Accompanied by Methane and Hydrogen-Sulfide Formation
Tamara N. Nazina, Elena P. Rozanova, and Sergei I. Kuznetsov 103

Computer Simulation of Sulfur Isotope Fractionation in a Closed Sulfuretum
R. O. Hallberg 131

The Role of Sulfate-Reducing Bacteria in the Deposition of Sedimentary Uranium Ores
Ali Mohagheghi, David M. Updegraff, and Martin B. Goldhaber 153

A Major Role for Nitrification in the Weathering of Minerals of Brown Acid Forest Soils
J. Berthelin, M. Bonne, G. Belgy, and F. X. Wedraogo..... 175

Preparation and Analysis of *Pseudomonas putida* Cells for Elemental Composition
F. J. Passman and G. E. Jones 191

Manganese-Rich Layers in Calcareous Deposits Along the Western Shore of the Dead Sea May Have a Bacterial Origin
H. L. Ehrlich and M. A. Zapkin..... 207

Papers of Interest in Other Journals 223

Meeting Announcements..... 229

Scanning Electron Microscopy and Infrared Spectroscopy of Iron Sediments Formed by *Thiobacillus ferrooxidans*
Norman Lazaroff, Linda Melanson, Ellen Lewis, Nicholas Santoro, and Curt Pueschel..... 231

A Comparison of Biogeological Properties of a Deep-Water Marine Stromatolite Analog with Those from Ice-Covered Antarctic Freshwater Lakes
George M. Simmons, Jr., Greenville B. Hall, Alfred T. Mikell, and F. Gordon Love 269

Association of Cyanobacteria with Tufa Deposits: Identity, Enumeration, and Nature of the Sheath Material Revealed by Histochemistry
Allan Pentecost 285

Humic Matter Enrichment in Reclaimed Soils Under Semiarid Conditions
J. Skujins and B. Z. Richardson..... 299

Effect of Biological Activity on the Movement of Fluids Through Porous Rocks and Sediments and Its Application to Enhanced Oil Recovery
B. Bubela 313

Book Review 329

Papers of Interest in Other Journals 335

Identification of Manganese-Oxidizing Bacteria from Desert Varnish
F. E. Palmer, J. T. Staley, R. G. E. Murray, T. Counsell, and J. B. Adams 343

Chemical and Microbiological Studies of Sulfide-Mediated Manganese Reduction
David J. Burdige and Kenneth H. Nealson 361

Role of Bacterial Plasmids in Manganese Oxidation: Evidence for Plasmid-Encoded Heavy Metal Resistance
C. Schuett, J. L. Zelibor, Jr., and R. R. Colwell 389

Mineralogical Characteristics of Residues Produced in Microbiological Treatment of Acidic Mine Drainages
Paul L. Wichlacz and Richard F. Unz 407

A Bacteriological Study of Geothermal Spring Waters Dating from the Dogger and Trias Period in the Paris Basin
Sylvie Daumas, Regis Lombart, and Armand Bianchi 423

Donald G. Lundgren: In Memoriam 435

Meeting Reports 437

Book Review 439

Papers of Interest in Other Journals 443

Instructions to Authors

Manuscripts. Manuscripts should be submitted to one of the following: Henry L. Ehrlich, Department of Biology, Rensselaer Polytechnic Institute, Troy, N.Y. 12181, U.S.A.; Wolfgang E. Krumbein, Geomicrobiology Division, University of Oldenburg, P.O. Box 25 03, D-2900 Oldenburg, Fed. Rep. of Germany; or Philip A. Trudinger, Baas Becking Geobiological Research Laboratory, P.O. Box 378, Canberra City, A.C.T. 2601, Australia. Papers, all or portions of which have been or will be published elsewhere, are not acceptable for publication in this Journal.

Manuscripts should deal directly or peripherally with geomicrobiology. Thus, papers which deal with micropaleontology, microbial biogeochemistry (cycling of matter, energy flow, etc.) or microbial ecology (interrelations of microbes and their environment) will be acceptable as long as the relation to geomicrobiology (microbial role in geologically important processes, past and present) is clear. Acceptable papers are not restricted to field studies. Laboratory findings on the biochemistry and physiology of geomicrobially active organisms will be favorably considered as long as the authors point out the relevance of their findings to geomicrobiology.

Short Letters-to-the-Editor and occasional review articles (no more than one per volume) will be considered for publication. Book reviews will be solicited by the editors.

Copyright. In conformance with copyright laws, authors will be required to sign a "copyright transfer agreement" upon acceptance of their manuscript for publication in this Journal. The agreement form will be included in the letter of acceptance to the submitting author. The agreement will protect the authors against misappropriation of their published work.

Form. Submit an original and two copies in English on good quality paper about 21 x 29 cm in size. *Type the text, references, legends, footnotes, abstract, and tables double-spaced, the latter two on separate sheets.* It is important to leave a margin of at least 25 mm all around on each page. Nothing should be underlined except generic and species names and secondary subtitles.

Abstract. An abstract, not to exceed 250 words, should precede the introduction. Do not include references or unfamiliar abbreviations or symbols.

Editorial Style. Be guided by papers in this Journal and the Council of Biological Editors (CBE) Style Manual. Follow Webster's International Unabridged Dictionary as the authority for spelling and hyphenation of words. Avoid breaking words at the end of lines. Système Internationale (SI) or modern metric units are used. Non-standard abbreviations should be defined at first mention. Standard abbreviations (refer to CBE Manual) do not require definition.

Figures. Graph and charts should be prepared in a consistent style, including lettering and numbering. They should be cleanly drawn with India ink on hard-surface paper or supplied in the form of good quality glossy prints. They should be no larger than 21 x 30 cm. The lettering should be large and clear enough to be legible when reduced by as much as 4x or to a width of 5.5 cm. Photographs should be sharp and glossy prints and no larger than 21 x 30 cm, including margins. On the back of photographs, graphs, and drawings, write in pencil the author(s) name(s) and the figure number; also indicate "top." Whenever appropriate, indicate magnification or size of a photograph with a scale line; otherwise give the magnification in the legend. Legends for figures should be typed on a separate sheet, quadruple-spaced between legends. Abbreviate Fig.

Tables. Each table should have a brief descriptive title. Do not include ex-

planatory material in titles; use footnotes, keyed with lower case letters at the bottom of the table. Use no vertical rules and underscore nothing that is not to be printed in italics. Horizontal rules should be placed one-half space or more below a typed line. Define all data in column heads with appropriate units or descriptions. Explanations can be given in footnotes keyed with lower case letters. Plan your tables to be no wider than 66 characters, including spaces, or 11 cm wide when printed.

Title Page. Short titles beginning with words that identify the subject are preferred for indexing and information retrieval purposes. The title page should include the name(s) of author(s), professional affiliation, and the complete address of the author to whom correspondence and proofs should be sent. If the title exceeds 45 letters, provide a shorter running head.

References. Literature citations in the text should be by author(s) and year. A complete listing in alphabetical order should appear at the end of the text. Titles of journals should be abbreviated according to the International List of Periodical Title Word Abbreviations (or see list in Chemical Abstracts Service Source Index, CASSI). Exclude from this listing reference to theses, abstracts, unpublished data, personal communications, and manuscripts in preparation, submitted for publication, or in press. Reference to such sources should appear parenthetically in the text. Examples of reference citations follow.

Cloud, P. 1965. Significance of the Gunflint (Precambrian) microflora. Science 148:27-45.

Dockins, W. S., G. J. Olsen, G. A. McFeters, and S. C. Turbak. 1980. Dissimilatory bacterial sulfate reduction in Montana groundwaters. Geomicrobiol. J. 2:83-98.

Fenchel, T., and T. H. Blackburn. 1979. Bacteria and mineral cycling. Academic Press, London, 225 p.

Gunkel, W. 1970. Light, bacteria, fungi and blue-green algae, p. 103-124. *In* O. Kinne (ed.), Marine Ecology, Vol. I, Part I. Wiley, London.

Page charges. No page charges are assessed.

Reprints. A total of 25 reprints will be supplied free of charge. Additional copies may be ordered at charges shown in the price scale to be sent to the author with copyedited manuscript.

This publication is available in microform.

University Microfilms International reproduces this publication in microform: microfiche and 16mm or 35mm film. For information about this publication or any of the more than 13,000 titles we offer, complete and mail the coupon to: University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106. Call us toll-free for an immediate response: 800-521-3044. Or call collect in Michigan, Alaska and Hawaii: 313-761-4700.

☐ Please send information about these titles:

Name _____

Company/Institution _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

University Microfilms International